The Global Voice of Pilots

IFALPA

SAFETY BULLETIN

25POS05
7 January 2025

Sustainable Aviation Fuels (SAF)

INTRODUCTION

Sustainable aviation fuels (SAF)[1] or certified drop-in fuels represent a broad category of fuels derived from renewable, non-fossil sources, including advanced biofuels and e-fuels, offering a sustainable alternative to conventional jet fuel. The introduction of SAF will play a major role in the future decarbonization of aviation, together with the introduction of new engine and aircraft technology and, more efficient flight procedures and ATM improvements. Certified drop-in fuels can readily be used and mixed with conventional fuels with no modification to engines and fuel supply infrastructure, contrary to non-drop in fuels.

NOTE

Different sources of feedstock may be used for SAF and may be processed in different ways. Different production pathways (or conversion processes) are available and certified to date, but more are likely to be certified in the near future, per feedstock and per pathway. The sustainability of SAF can be derived from a life-cycle assessment from well to wake to quantify the true reduction of GHG emissions.[2]

NOTE

The impact on life, earth, and society can be assessed according to the UN Sustainable Development Goals.[3] *Secondary positive effects may accompany the introduction of SAF as local air quality (LAQ) may be improved because of the different fuel composition, and contrail formation or contrail radiative forcing during flight may be reduced.*

The main issues for large-scale use are the scaling-up of production, the availability of sustainable feedstock and green energy, the certification of all pathways, the costs of investments and pricing of SAF, and fair global access to SAF and SAF production facilities according to ICAO's No Country Left Behind (NCLB) initiative.

[1] https://www.icao.int/environmental-protection/Pages/SAF.aspx
[2] CORSIA Eligible Fuels - Life Cycle Assessment Methodology, ICAO 2022
[3] https://sdgs.un.org/goals

From the safety and operational perspective, (sustainable) aviation fuel must meet strict quality standards. Conventional aviation fuel is produced in petroleum refineries and distributed by transportation and logistics companies following controlled procedures and protocols to guarantee that the product remains within specification, without deterioration or contamination during transport and storage. The same criteria must be met for SAF while the production of SAF will originate from smaller plants with different feedstocks and may be blended with conventional fuels at different stages. Quality control and traceability of SAF will be essential.

HIGH LEVEL PRINCIPLE

IFALPA will continue to contribute to the industry's efforts to minimize the environmental impact of commercial aviation. **IFALPA believes that the aviation industry, while continuing to pursue the highest level of aviation safety worldwide, should be environmentally, economically, and socially sustainable**.

Measures to reduce the environmental impact of commercial aviation must balance technological and operational feasibility, fair economic principles, and environmental benefits, while ensuring that safety is not compromised.

POSITION

Certification Standards

IFALPA believes that all aviation fuels, including SAF and conventional, should adhere to the highest quality standards. For production and use, the standards[4] are, in general, defined by ASTM D1655 jet fuel standard (not by ICAO). The aviation industry relies on ASTM to prove operational compatibility of SAF with the aircraft and engine operation with specified blends. **Quality control is vital so that fuel quality standards are met through production, transportation, blending, and use**. The standards for quality control are based on present requirements for control, distribution, and traceability of aviation fuels (EI / JIG 1530 and 1533 for SAF). See ICAO Doc 9977 for background.

Safety Issues

The use and handling of SAF must meet an equal or higher safety standard than for conventional aviation fuel. The characteristics of SAF (e.g., flash point, flame-out characteristics, lubrication properties, freezing point, cold weather performance, thermal stability, corrosion properties, contaminants, water solubility, inadvertent ignition, and fire suppression properties) characteristics are handled by the certification standards (D7566) and in general outperform conventional fuel standards (D1655). The energy

[4] https://www.iata.org/contentassets/d13875e9ed784f75bac90f000760e998/saf-technical-certifications.pdf

density is incorporated in the certification standard. However, it may differ from conventional ranges.

IFALPA supports further assessment of the operational and safety risks of the use of SAF. It is strongly recommended that the traceability of SAF be improved and related operational incidents monitored. Transparency in the fuel supply chain is required to monitor the origin of the SAF for quality control, safety management, and credibility of the environmental performance.

Pilot Notification

In general, different types of drop-in SAF have the same technical and operational characteristics as conventional fuels. **In cases where the use of SAF results in operational limitations or differences, flight crews should be notified**.

True Sustainability

The true benefit of equivalent carbon savings with respect to climate impact should be assessed, covering the whole lifecycle: the production, transport, and actual operation compared to carbon fuels. At the same time, other social, economic, and sustainability criteria in accordance with the UN Sustainable Development Goals (UN SDG) and the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) should be respected. IFALPA believes that the sustainability of SAF should be based on two pillars:

- **The sustainability of SAF should be verified** in accordance with the regulatory bodies of States; the criteria should be clear, transparent, robust and in accordance with the UN SDG and the CORSIA eligible fuel criteria.

- **A life-cycle assessment of SAF**, **including production, transport, feedstock and ultimate fuel burn, is needed** to assess the total demand on water, soil, and energy and to calculate the total environmental benefit in order to compare with the production and use of fossil-based fuels.

Availability and Economics

Availability of short-, mid-, and long-term feedstock, green energy, production facilities, and infrastructure will be critical. Currently, there is not enough SAF available to fuel the world's commercial airlines for even a single day. A huge demand for SAF is anticipated to meet future air traffic demand and future climate goals. Increasing availability will be essential to reduce the cost differential with conventional fuels and to reach (aviation) climate goals**.**

IFALPA believes that ICAO and its Member States should play a leading role in supporting wide-scale production and use of SAF through research and development support, partnerships, financial incentives, the inclusion of SAF in CORSIA and the European Union Emission Trading Scheme (EU-ETS) and possibly SAF blending mandates (only if embedded in a wider strategy to encourage SAF production).

IFALPA believes that supportive, long-term policies are needed from States and ICAO and that these supporting measures should not distort the aviation market.

In principle, all options for feedstock or production pathways should be explored for use in order to meet the future demand for SAF, as long as these are truly sustainable. A full range of diverse SAF pathways (including e-fuels) will be necessary to provide meaningful decarbonization.

It must be emphasized that drop-in fuels are the only viable large-scale short/mid-term solution for reducing CO_2 emissions. These drop-in fuels can be implemented immediately with existing engines and infrastructure.

REFERENCES

- 22POS05 Long-Term Aspirational Goals (LTAG) for CO2 Reductions
- 15POS14 Safe and Sustainable Aviation
- ICAO Guidance on Potential Policies and Coordinated Approaches for the Deployment of Sustainable Aviation Fuels, 2022
- ICAO Doc 9977 Manual on Jet Engine Fuel Supply, 2012
- FAA, Sustainable Aviation Fuel, Review of Technical Pathways, 2020
- Airlines for Europe Position Paper, Global SAF Vision 2023
- IATA: Understanding SAF Sustainability Certification, 2024;
- See References on https://ifalpa.sharepoint.com/sites/climateWG